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THE VETERINARY JOURNAL

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A Monthly Review of Veterinary Science.

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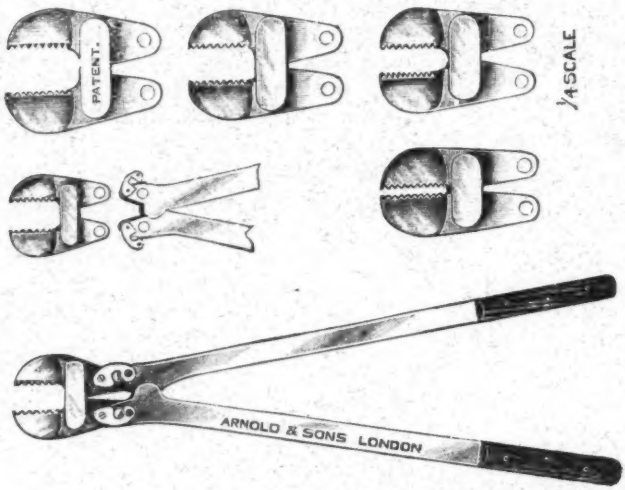

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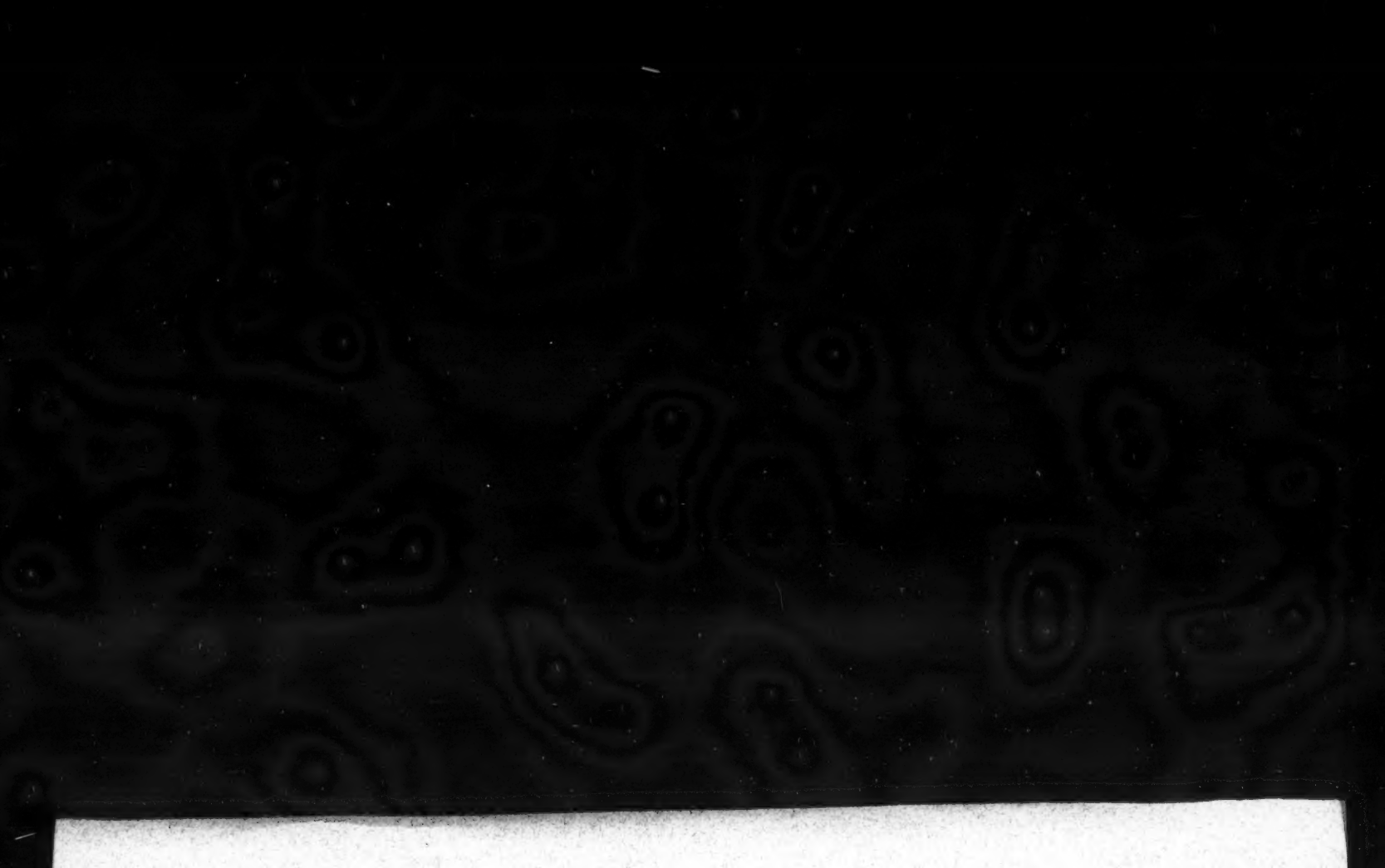

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FELLOWSHIP DEGREE.

A Meeting of the Board of Examiners for the Fellowship Degree was held at the College, 10, Red Lion Square, W.C., on Saturday, May 17th. The following is a list of the successful candidates, together with the titles of their respective theses:

Alexander Crabb,	"The Veterinary Surgeon and his relation to the Refrigerated Meat Supply."
Wm. Lancelot Little,	"Periodontal Disease of Horses."
J. R. Hodgkins,	"Rinderpest in India."
W. Ashe King,	"Foot-and-Mouth Disease."

The Examiners were Mr. W. Hunting, Prof. J. Macqueen, and Mr. J. Malcolm; Mr. W. J. Mulvey in the chair.

Fred. Bullock, Secretary.

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THE

VETERINARY JOURNAL

JUNE, 1913.

Editorial.

VETERINARY CHARITIES.

In a previous issue of The Veterinary Journal we drew attention to the spirited action of Mr. Percy Simpson in persuading a very powerful party of amateur actors and actresses to give their time and services for the production of "Sweet Lavender" on behalf of the Victoria Veterinary Benevolent Fund. Now we are very pleased indeed to congratulate him and them on the performance and on the really magnificent result of their work. As will be seen from the short statement of accounts on pp. 291-2, the Fund will benefit by the really wonderful amount of £70. Such a sum far and away exceeds our most sanguine hopes, and our sincerest and unstinted thanks are due to all those who assisted in attaining it, either by their services or by their generous donations and the purchase of tickets.

As to the performance, we may say, with absolute truth, that it was far and away the best amateur performance it has ever been our good fortune to witness. The flattering notice which it received in the local Press must have been very pleasing to the producer and players, but they must have been even more pleased with the good notice accorded to the performance by *The Stage*, a paper which has a habit at times of telling unpalatable truths with almost brutal frankness. And to think that this was all on behalf of a veterinary charity and, with the exception of Mr. Simpson, by people who have no direct association with our profession, makes us all the more grateful.

A criticism of the individual performers would convey very

little to our readers, as the former (with one exception) are personally unknown to them, so it must suffice to say that there was not a weak spot to be found in the cast. The exception referred to above is, of course, our esteemed *confrère*, who organized the performance. He took the *rôle* of Clem Hale, whose duty, and a very pleasant duty it appeared to be, was to woo and to make love to Sweet Lavender. Many of us are already aware of Mr. Simpson's marked ability in his legitimate profession; his histrionic ability is not far behind, and apparently in the happy pastime (shall we call it so?) of making love, he is certainly a past master. But who could not have made love to Sweet Lavender?

The great success of Mr. Simpson's effort should go far to encourage other members of the profession to "go and do likewise." There are many other ways in which the Fund might be helped if only members will exercise a little ingenuity and devote a little time to this "labour of love." One should not be deterred by the excellence of Mr. Simpson's results; on the contrary, one should be encouraged, and should remember that every little helps, and that "many mickles mak' a muckle."

On behalf of our less fortunate *confrères* and their widows and orphans, we offer our most sincere thanks to Maidenhead and to all who helped to make such a success, including the producer, the players, the "great unseen," the orchestra, the dainty programme sellers, and the makers of the very pretty "Sweet Lavender" bags given and sold for the benefit of the Fund.

General Articles.

SHORT NOTE ON THE PREVALENCE OF BOVINE SARCOPTIC SCABIES.

By A. W. NOEL PILLERS, F.R.C.V.S.
Liverpool.

In The Veterinary Journal for 1909, p. 434, I gave an account of an outbreak of sarcoptic mange amongst housed milking cows, together with a review from Neumann [1] of the comparatively rare occurrence of the disease. In the outbreak there recorded twenty-six out of fifty-nine animals were affected. Since that time I have paid some attention to this disease and find that during the winters of 1911 and 1912 it was the only mange I was able to find in housed cattle in this town. Statements as to its rarity are to be found in many writings. The Board of Agriculture and Fisheries [2] state that sarcoptic mange is uncommon. Law [3] mentions isolated cases described by Continental authorities. Megnin [4] stated that after six to seven years' research he had yet to see his first case of bovine mange of any kind, but he quotes Hering, Furstenburg and Delafond to show that sarcoptic, chorioptic and psoroptic mange do occur in cattle. He does not include a description of his own of the parasite in the text, but gives Hering's details and measurements. In housed cattle I have only been a little more successful than Megnin, for whilst he was unable to find any of the three forms, I have often come across sarcoptic mange to the exclusion of the others. Raillet [5] is equally sceptical concerning this mange. He mentions several authors' cases, and supposes that they have been dealing with transmissions either from the horse or cat. Freidberger and Fröhner [6] devote five lines to the disease, and add a short note to the effect that there is no longer any doubt as to its actual occurrence, as numerous cases have been recorded during recent years. The above authorities have been quoted with the hope of stimulating microscopical examination of skin lesions in cattle.

During the last two winters the disease has been encountered in fifteen centres, involving in all forty-seven animals, and this to the exclusion of other forms. Each case has been diagnosed by the presence of the sarcopt, which seems easier to find than that of the horse and dog, almost as easy as in the cat.

The disease possessed the same features as mentioned in the last article, *viz.*, marked irritation in warm sheds, appreciably lessened the quantity of milk given, affected the same parts, caused irritation to the attendant's arms, and disappeared when the animals were turned out to grass in May or June. The diagnosis of *Sarcoptes scabiei bovis* in scrapings was kindly confirmed by several veterinarians in most of the outbreaks.

This short note has been recorded to help to show that sarcoptic mange in the ox is more prevalent, at least in this country, than is supposed. One cannot help but notice in most of our text-books a great similarity in the names and cases mentioned, without original observations to prove or discredit the statements of older observers and writers.

REFERENCES.

[1] NEUMANN. "Parasites and Parasitic Diseases of the Domesticated Animals." Translated by Professor Macqueen. 2nd edition, London, 1905, p. 146.
[2] Board of Agriculture and Fisheries, Leaflet 135, "Mange in Cattle," London, 1907.
[3] LAW. *Veterinary Medicine*, 2nd edition, vol. v, p. 203.
[4] MEGNIN. *Les Parasites Articulés.* Paris, 1895, p. 348.
[5] RAILLET. *Traité de Zoologie Médicale et Agricole.* 2nd edition, Paris, 1895, p. 65.
[6] FREIDBERGER and FRÖHNER. *Veterinary Pathology.* 3rd edition, London, 1905. Translated by Captain Hayes, F.R.C.V.S., voi. ii, p. 488.

THE DOSING OF SHEEP WITH COOPER'S DIP AND BLUESTONE FOR WIRE-WORMS.*

BY DR. ARNOLD THEILER, C.M.G.
Acting Director of Veterinary Research.

IN No. 3 of the *Agricultural Journal*, March, 1912, a series of experiments were enumerated which were undertaken to find out the maximum dose of a mixture consisting of equal quantities of bluestone and Cooper's dip, in dry powder form, which could be given to a number of sheep ageing from two-tooth upwards without risk of mortality A total number of 147 sheep were dosed with 15 gr. of bluestone and 15 gr. of Cooper's dip, and none died from the effect of this dose; one of the experimental sheep succumbed after dosing from accidental causes. This dose was accordingly considere ..to be a safe one. In another series of experiments it was shown that when, to a safe dose of these

* See also VETERINARY JOURNAL, June, 1912.

drugs, such non-poisonous materials as salt and sulphur were added in equal parts, the otherwise safe dose of Cooper's dip and 15 gr. of bluestone caused death. It was then concluded that under our conditions the safe maximal dose, *i.e.*, 15 gr. of Cooper's dip and 15 gr. of bluestone, could not be recommended indiscriminately, because it was thought that in practice the local conditions on the different farms might influence the toxicity of the safe dose just as the addition of the harmless substance had done. For this reason it was strongly recommended that a farmer who wished to increase the dose of any of the drugs should first of all experiment on a small number of sheep, taking care that the initial trial was conducted under the representative conditions of his farm. If it was found to be successful it should be repeated on a larger scale, and not until the farmer had convinced himself by trials on a number of sheep that he had found the dose which met the conditions on his farm should he dose the whole flock.

A farmer in the Stutterheim District used the dose alluded to, *viz.*, 15 gr. of Cooper's dip and 15 gr. of bluestone, on a number of sheep, interpreting my recommendation to mean that this dose was the one recommended under all conditions, and that trial experiments as suggested by me only referred to larger doses. The result of this dosing was somewhat disastrous, as a number of sheep died from poisoning. The farmer was good enough to immediately draw our attention to this result, asking at the same time for an investigation. As it was first thought that a mistake had occurred in the dosing, attention was given to weight and measurement, but it was found that these were correct. It had, therefore, to be concluded that the cause of the discrepancy in the results of the two places, *i.e.*, on a farm in Stutterheim District and in the Laboratory at Onderstepoort, lay either in the conditions of the farm itself or in the sheep. However, one important fact was forcibly brought home, namely, that the mortality on the Stutterheim farm only occurred amongst the *two-tooth sheep*. As the matter was of the greatest importance, and the opportunity had offered itself to repeat the experiment under the conditions of the sour veld, full advantage was taken to find out the maximal dose for the two-tooth sheep as well as for lambs (which latter hitherto had only been experimented with on a small scale).

The results were as follows:—

EXPERIMENT NO. 1—WITH SHEEP.

NOTE.—Half of each of the following lots were kept away from water a day previous to and a day after dosing ("not watered lot"). The others were driven to the water shortly after dosing, but they did not drink at the time ("watered lot").

RÉSUMÉ.

Ten sheep dosed with 7½ gr. Cooper's dip + 7½ gr. of bluestone. Result: None died.

Ten sheep dosed with 10½ gr. of Cooper's dip + 10½ gr. of bluestone. Result: None died.

One hundred and thirty-seven sheep, *two-tooth*, dosed with 10 gr. of Cooper's dip + 10 gr. of bluestone. Result: None died.

Ninety-two sheep, *two-tooth*, dosed with 12 gr. of Cooper's dip + 12 gr. of bluestone. Result: Four died.

Ten sheep, *two-tooth*, dosed with 15 gr. of Cooper's dip + 15 gr. of bluestone. Result: Three died.

Forty-nine sheep, four to eight tooth, dosed with 15 gr. of Cooper's dip + 15 gr. of bluestone. Result: None died.

CONCLUSIONS.

Under the conditions of the sour veld in the Stutterheim District, the dose of 15 gr. of Cooper's dip and 15 gr. of bluestone administered in a mixture proved to be safe for four eight-tooth sheep. The same dose, when given to two-tooth sheep, proved fatal to the extent of 30 per cent. The dose of 12 gr. of each proved fatal for four out of a number of ninety-two two-tooth sheep treated = 4.4 per cent. The dose of 10 gr. of each proved to be the *safe dose when given to* 137 *two-tooth sheep*. The two-tooth sheep decidedly proved to be the most susceptible, both in the "safe" and "unsafe" doses.

EXPERIMENT NO. 2—WITH LAMBS.

RÉSUMÉ.

The lambs referred to in Experiment No. 3 have also been included herein, as at the time of slaughter it could easily be seen that they would not have died as a result of dosing:—

Eight lambs over five months old dosed with 3 + 3 gr. Cooper's dip and bluestone. None died. Sixteen lambs over five months old dosed with 6 + 6 gr. Cooper's dip and bluestone. None died. Fifty-three lambs over five months old dosed with 7½ + 7½ gr. Cooper's dip and bluestone. None died. Ten lambs over five months old dosed with 9 + 9 gr. Cooper's dip and bluestone. One died = 10 per cent.

Result: The dose of 9 gr. of Cooper's dip and 9 gr. of bluestone proved to be fatal for one out of ten lambs = 10 per cent.

CONCLUSION.

The safe maximal dose of Cooper's dip and bluestone was found to be 7½ gr. of each for a number of fifty-three lambs of five months old and above.

EXPERIMENT No. 3.

To Ascertain the Smallest Effective Dose of a Mixture of Cooper's Dip and Bluestone.

Although the experiments to this effect are not yet complete, the results obtained in connection with the experiments under consideration are given hereunder.

It must by no means be concluded that the maximal dose of the mixture of bluestone and Cooper's dip is also the optimal one, *viz.*, the one which kills the greatest number of worms in the animals; there may be a smaller dose having the same or perhaps even a better effect. It is possible that the larger dose acts as an irritant on the mucosa of the stomach, whereby the drugs are not being properly dissolved and distributed throughout the stomach itself but are rapidly passed on to the small intestines. A smaller dose would be dissolved more rapidly and the drugs would then come in contact with the worms present.

To control the effect of the drug the experiment was undertaken in three different ways: (1) By killing some of the animals dosed. (2) By counting the worm eggs in the droppings of the animals before and after dosing. (3) By means of cultures,* *viz.*, the eggs were allowed to hatch in a glass tube. A few days after the collection of the droppings the various droppings were examined, and it could be ascertained if any decrease had taken place. (Method No. 3 served as a control to No. 2.)

(A) ANIMALS KILLED AFTER DOSING.

Result: Eight lambs whose bad condition was thought to be caused by wireworms were given doses of bluestone and Cooper's dip, varying in quantity from 3 gr. of each to 6 gr. of each, and were killed after dosing. The dose did not produce any appreciable lesions. The two lambs which had been dosed with the maximal dose of 6 gr. still contained a few wire worms in the stomach. It is remarkable that in all lambs *Œsophagostomum columbianum* (knopjes worm) were apparently not affected by dosing.

(B) OVA (EGGS) COUNTED BEFORE DOSING AND SHEEP KILLED AFTERWARDS.

Results: Nine lambs whose droppings, on microscopical examination, showed ova were given doses of Cooper's dip and bluestone, varying from 3 gr. of each to 9 gr. of each. On *post-mortem* examination wireworms were found to be present in the lambs dosed with 3 gr. and in one lamb dosed with 7½ gr. Some lambs also showed infection with *Œsophagostomum columbianum* (knopjes worm).

* In a later report the life-history of the wire worm and the methods adopted to cultivate it will be given with more details.

(B) (1) Controls.

Animals not Dosed and Killed.

Results: Of five control lambs which showed ova in the droppings and were killed without dosing, one showed no wireworms on *post-mortem* examination; two showed them in very rare numbers and two showed them frequently and very frequently, respectively.

All five lambs were infected with either *Œsophagostomum columbianum* or other round worms not yet identified.

(C) Counting of Ova and Comparison with Cultures.

Note.—The method adopted was as follows:—

Counting of the Ova.—One part of the droppings was well mixed with fifty parts of water and a thin film was then spread over four glass sides. Of each slide fifty fields were examined microscopically (representing in all an area of about 2 square in.) and a count was made of the number of eggs present.

Cultivation of the Ova.—At the same time some droppings were placed in a culture tube to which water was added if the material became too dry; the tubes were examined later by the naked eye and the presence or frequency of the embryos (ensheathed) was recorded.

Summary showing the Effect of the Various Doses of Cooper's Dip and Bluestone on Lambs.

Reference No	Condition of lamb	Microscopical examination of droppings before dosing	Dose of Cooper's dip and bluestone used		Interval between dosing and slaughter of lamb. Days	Remarks as to presence of *Strongylus contortus* in stomach on *post-mortem* examination
			Cooper's dip. Grains	Bluestone. Grains		
1	Poor ...	—	3	3	1	*Nil.*
2	,, ...	—	3	3	1	Frequent.
9	,, ...	Ova rare	3	3	3	*Nil.*
10	,, ...	Ova present ..	3	3	3	,,
11	Good ...	,, ...	3	3	4	Rare.
12	Fair ...	,, ...	3	3	4	Present.
3	Very poor	—	3	3	6	*Nil.*
4	Poor ...	—	3	3	6	,,
5	,, ...	—	6	6	1	,,
6	,, ...	—	6	6	1	Very rare.
13	,, ...	Ova present ...	6	6	3	*Nil.*
14	,, ...	Ova fairly frequent	6	6	3	,,
7	Very poor	—	6	6	6	,,
15	,,	Ova very rare ...	7½	7½	3	,,
16	Good ...	Ova present ...	7½	7½	4	Very rare.
17	Poor ..	,, ...	9	9	3	*Nil.*
18	Fair ...	,, ...	9	9	3	,,
8	Ewe ..	("Bottle") ...	12	12	22 hours	Present.

Result: Smaller doses of Cooper's dip and bluestone than the maximal optimal does appear to be as effective for lambs as the maximal safe dose.

SUMMARY OF CONCLUSIONS.

The maximal safe dose for sheep of four to eight tooth under the conditions of the sour veld in Stutterheim District was found to be 15 gr. of Cooper's dip and 15 gr. of bluestone.

The maximal safe dose for sheep of two-tooth under the same conditions proved to be 10 gr. of Cooper's dip and 10 gr. of bluestone.

The maximal safe dose for lambs between five and nine months old under the same conditions proved to be $7\frac{1}{2}$ gr. of each.

Smaller doses than the maximal ones proved to be equally effective on the wireworms as the maximal safe dose. (This, however, requires further investigation on a much larger number of sheep and lambs.)

The mixture of Cooper's dip and bluestone, even in the maximal doses, does not expel all worms, although it reduces their number.

RECOMMENDATION.

As a medium dose the following can be recommended:—

Sheep of four to eight tooth: 10 gr. of Cooper's dip and 10 gr. of bluestone.

Sheep of two tooth: 7 gr. of Cooper's dip and 7 gr. of bluestone.

Lambs of six to nine months: 5 gr. of Cooper's dip and 5 gr. of bluestone.

(Full details of these experiments can be seen in the *Agricultural Journal of the Union of South Africa* for August, 1912.)

STRONGYLUS CLATHURTUS, BAIRD.

By S. N. MITTER, G.B.V.C.

Lecturer on Pathology, Bengal Veterinary College.

(From the Raymond Research Laboratory, Calcutta, India.)

ABOUT forty-five years ago Dr. Baird described this parasite for the first time under the name of *Sclerostoma clatharatum* in the *Proceedings* of the Zoological Society of London. The nematodes were obtained from the stomach of an African elephant by Dr. Murie, who sent them to the British Museum. The elephant died in London in 1867. Thirteen years later Dr. T. Spencer. Cobbold described the same parasite under the name of *Strongylus clathurtus*, Baird, in the *Transactions* of the Linnean Society of 1881. His material was obtained from an Indian

elephant, and was, he believed, all removed from the small intestines. In Dr. Murie's find the specimens except one were all females, but Dr. Cobbold's specimens were all males.

In India, Lieut.-Colonel Evans and Mr. Rennie described from Burmah in *Journal of Tropical Veterinary Science*, vol. v, No. II., an uncinaria (?) from the biliary duct of an Indian elephant, which, I believe, is identical to *Strongylus clathurtus*. This parasite is reported to be common there.

Lately I had an opportunity of studying two specimens (♂ and ♀) of this nematode removed from the biliary duct of an Indian elephant. Both of them were received in mutilated condition, and as my observation had been based on these two isolated specimens, it will necessarily lack in many histological details.

Description of the Parasite.

The parasites were fairly large and of a dirty white colour, and striated transversely. The ♂ measured 45 mm. in length, and the ♀ 40 mm. The ♂ was narrowed in front and expanded behind; the ♀ tapered in front and behind. The head was small. The buccal capsule was deep, well defined and cup shaped, and surrounded by auricular folds. The cavity was furnished with a few spines and horny teeth. The œsophagus was rather long, well-developed, muscular, and dilated at its posterior extremity. This was followed by an intestine of an uniform calibre. The tail of the ♀ was moderately pointed, and slightly above it was noticed the anal pore. About midway between the cephalic and caudal extremity was found the situation of the genital pore. The uterus was big, highly convoluted, and extended from œsophagus down to the anal pore. The arrangement of the testicular tubes was noticed chiefly at the anterior half of the body. The caudal bursa was very prominent and markedly defined, and contained two anterior, one antero-lateral, two middle, one posterio-lateral, and one posterior rays. Anterior ray is short, blunted, and double; antero-lateral simple, long, and straight; middle, large and double; posterio-lateral, moderately long, slender, and simple; the posterior ray slightly notched at the extremity. The spicules were two in number and of equal length, and highly coloured. Each of them appeared to be moderately broad, membraneous expansion around a strong shaft or mid-rib, the whole structure resembling a leaf.

A NOTE ON SOME INTERESTING RESULTS FOLLOWING THE INTERNAL ADMINISTRATION OF ARSENIC IN CANKER AND OTHER DISEASES OF THE FOOT IN HORSES.

By J. D. E. HOLMES, M.A., D.Sc., M.R.C.V.S.
Imperial Bacteriologist, Muktesar Laboratory.

While carrying out experiments with arsenious oxide in the curative treatment of surra in horses I had an opportunity of observing the effects of arsenic in certain other pathological conditions, especially that of canker of the foot.

The value of arsenic in veterinary practice, as a general tonic, is well known, and it is occasionally given to improve the coat and condition of horses. In all our experiments with surra, which extended to three hundred or more ponies and horses, this tonic effect of arsenic was most marked. Animals in the last stage of emaciation rapidly regained their strength and condition.

In these cases arsenic was administered in full sub-toxic doses, commencing at about 1 grm. and gradually increasing to about 3 grm. Ten doses were given at an interval of one to two days between each dose. In some instances subcutaneous injections of atoxyl were given alternately with the arsenic by mouth.

A full description* of this method of treatment, by which we have cured many cases of surra in horses, has been previously published, and need not be further described here.

Canker of the Foot.

Among a number of country-bred ponies, purchased for experimental work, and which had been inoculated with surra and were under treatment with arsenic, one was observed to be suffering from canker of the off fore-foot. The disease was of long standing, the foot being deformed, the heels contracted, and the sole covered with a spongy fungoid growth from which a foul odour emanated. The foot was dressed occasionally with tar as an antiseptic, during the time that the pony was undergoing his course of arsenic treatment for surra. The pony had a relapse after the first course of arsenic and received a second course of treatment which resulted in a cure. In all he received twenty doses of arsenic in bolus. During the second course of

* *Parasitology*, vol. iii, pp. 73, 107. *Parasitology*, vol. iii, No. 3, October, 1910.

treatment, my attention was drawn to the improvement which had taken place in the diseased foot. The fungoid growth had entirely disappeared, and a firm and healthy tissue covered the sole and frog. By the time that the second course of treatment was completed the foot was to all appearance normal; no pain or tenderness was evinced when pressure was applied to the sole and frog and the pony was going sound. This animal was kept under observation for twelve months and the foot remained in a healthy condition. In order to ascertain how far in this case the disappearance of the disease was due to the administration of arsenic, I obtained at a later date three horses suffering from canker of the foot. Two were aged, country-bred horses from a Native Cavalry Regiment. The disease was of some two years' standing and all four feet were badly affected. The feet were long and club-shaped and the sole and frog had been completely replaced by fungoid growth, which bled on the slightest provocation. The horses were in pain and moved with difficulty on the toes of the feet. These two cases received three courses of arsenic and atoxyl during a period of six months. The doses were given on the same method as for the treatment of surra. Each course lasted about three weeks and consisted of five doses of arsenic in bolus and five subcutaneous injections of atoxyl. Between each course an interval of three to four weeks was allowed.

After the first course the condition of the feet showed a very marked improvement. The sole had assumed a healthy appearance; almost all the fungoid growth was gone and healthy tissue had taken its place.

After the second course of treatment the feet had returned to a quite normal condition. The disease had entirely disappeared, the sole was covered with hard and sound tissue and the frog and bars had grown into shape. The horses were able to put the feet to the ground without pain and walked sound. The whole structure of the feet appeared normal and healthy with the exception of a small area in the sole in the near hind of one horse and in the off hind of the other. This area, which was about the size of a shilling, was less firm than the surrounding parts and, on pressure, pain was evinced.

A third course of treatment followed, after which no trace of any disease of the feet could be detected. The horses were

kept under observation for twelve months. The feet remained healthy with the exception that in each case the area in the hind foot, which was the last to heal, again softened, and on cutting down it was found that a small amount of cankerous growth still remained.

These cases received no further treatment. The third horse was a waler from the Artillery. The off fore-foot was extensively diseased, the other three only to a slight extent. He was given two courses of treatment with arsenic and atoxyl. The same rapid improvement in the feet followed and in about two months it was impossible to detect any abnormality or disease of the feet. The horse was going sound and was returned to duty.

I was informed, however, that this horse was again attacked with canker of the foot in the following year.

In none of these cases was local treatment resorted to, beyond the application of tar or other antiseptic dressing to the diseased feet.

It has not been possible to make any further experiments on this subject as other cases of canker have not been procurable up to the present.

These four cases have, however, been sufficient to demonstrate that the internal administration of arsenic in large doses at spaced intervals, either alone or in combination with subcutaneous injections of atoxyl, produces a very rapid and remarkable improvement in cases of canker of the foot.

All lesions of the disease disappear, and healthy tissue takes the place of the fungoid growth. The sole and frog become hard and to all outward appearance healthy, and the animal goes sound and is fit for work. The experiments have not been sufficient to discover if a permanent cure of the disease can be obtained by this treatment. The combination of local treatment with the internal administration of arsenic would in all probability give more permanent results. The arsenic acts in the first place as a tonic and improves the general condition. It is also recognized that arsenic increases the proliferation of epithelial cells. The rapid formation of the new and healthy tissue, which gradually curtails and replaces the fungoid growth, is in response to this stimulus.

It is also possible that arsenic may have a direct action on the still unknown causal organism of canker.

Thrush, Sandcrack and Brittle Hoof.

The same method of arsenic treatment has been tried with the most excellent results in other diseases of the feet, such as thrush, sandcrack, defective and brittle hoof, cracked heels, &c. In some cases the internal treatment alone has been relied on and in others it has been combined with local applications.

In all cases a rapid improvement and cure has resulted. With the combined treatment the results were somewhat more rapidly obtained.

One case I may mention of a young horse which was incapable of being worked owing to defective fore-feet. The wall of the foot was not more than from two and a half to three inches in length; the edges were frayed and fissured upwards from a half to one inch. The sole of the feet was thin and the horse walked with great difficulty and pain. The application of blisters to the coronets had been tried but failed to produce much improvement in the condition of the wall of the feet.

The horse was put under a course of arsenic. After the first course the growth of the wall had considerably increased and was of more healthy texture. Two further courses of arsenic were given within three months, at which time the feet had grown to a normal size and a dense wall had formed, which showed no tendency to brittleness. The horse was shod and went sound.

The Absorbent Action of Arsenic on Melanotic and other Tumours.

Another interesting observation regarding the action of arsenic was made during the experiments with surra.

One subject of these experiments was a mare which had been cast from the Army for melanotic tumours. These tumours varied in size from that of a marble to a cricket ball and were situated on the body, neck and thighs. The mare was inoculated with surra and received two courses of treatment with arsenic and atoxyl.

After the first course of treatment it was noticed that many of the smaller tumours had disappeared and by the time the second course was completed even the large tumours had entirely vanished. The mare was cured of surra and kept under observation for some eighteen months. About six months after the arsenic treatment the melanotic tumours again formed and were in a few months as large and numerous as before.

In order to test the absorbent power of arsenic on other tumours, I obtained two horses, one having a tumour on the inside of the off fetlock. This tumour had originated about twelve months previously from a bursati sore. The tumour at this time involved about three inches above and three below the fetlock joint, and was so large that it brushed against the opposite fetlock. It had been treated without improvement for several months. The horse was given three courses of arsenic and atoxyl during six months. Antiseptic dressings were applied to the tumour. No local treatment, except antiseptic dressings, was used. The tumour gradually became absorbed and by the expiration of six months it was completely removed, leaving a granulating surface of some three inches in diameter which eventually healed.

The other case was one of epithelioma involving the penis. The tumour was considerably larger than a cricket ball and it and part of the penis protruded from the sheath. The surface of the tumour was raw and ulcerated.

Antiseptic dressings were applied and the horse was placed on a course of internal treatment with arsenic.

Two courses of arsenic were given. The tumour decreased to about half its original dimensions. There was very marked proliferation of the surrounding normal tissue which in many places invaded and encapsulated parts of the tumour.

At this time the horse accidentally contracted tetanus and died.—*Bulletin* No. 32, Agricultural Research Institute, Pusa.

HUMANITY IN THE ABATTOIR.

By LOUDON M. DOUGLAS, F.R.S.E.
Edinburgh.

Some little time ago a demonstration of humane methods in the slaughtering of cattle, sheep, and pigs, was carried out at the Edinburgh Abattoir, and resulted in directing widespread attention to the safety and ease with which humane slaughtering instruments can be used. These weapons of precision have been brought to their present state of perfection through the efforts of the Royal Society for the Prevention of Cruelty to Animals, of London, under whose auspices the Edinburgh and other demonstrations have been held.

It may be stated that the sale of these weapons is carried on by the Royal Society for the Prevention of Cruelty to Animals without any profit whatever, the cost price only being charged to users. The cost of the demonstrations is provided for otherwise. In this way the initial outlay to users is very small.

The weapons are of three kinds, viz., the humane killer, with long-arm attachment for cattle; the captive bolt pistol, for calves, sheep and pigs; and the spring bolt pistol. These several types have their advantages, the smaller weapons being particularly adapted for use with the smaller animals. The weapons have one feature in common, inasmuch as they produce instantaneous unconsciousness in the animals, by perforating the brain, which is the recorder of all sensations. The bleeding of the carcases can then be proceeded with, without inflicting any pain whatever.

The great feature of these weapons is their simplicity. They supersede the pole-axe for cattle, and require no particular skill in handling. The pole-axe in the hands of an expert is a precise weapon, but experts require training, and as there are no means by which such training can be acquired, except by haphazard opportunities in the abattoirs, it is clear that the substitution of mechanical slaughtering weapons for the uncertain pole-axe is much to be desired. The result on the carcase is the same, and that is a great matter; the bleeding is not different in the one case from the other, and there is a great advantage in eliminating the element of bleeding during consciousness.

Hitherto very little has been done in connection with the stunning of the smaller animals used for food, owing very largely to the prejudice which exists in the minds of many meat purveyors, who cannot get away from the traditional practice. The same arguments apply to the smaller animals, however, as to cattle, and it has been shown over and over again that the work of slaughtering can be done quite as expeditiously and as well by the aid of the smaller weapons as by the traditional methods. The result on the carcases is the same.

As has been mentioned, the Royal Society for the Prevention of Cruelty to Animals has given demonstrations at various abattoirs; it has been found that these have a high educational value, and they have shown in actual practice that the claims which are made for the humane weapons are justified.

It is proposed to continue these demonstrations in important

centres and, in pursuance of this policy, it has been arranged to give a demonstration at Salford abattoir on June 10 next, when the various weapons mentioned will be used.

The members of the Manchester and Salford Meat Traders' Association will be present, as well as many who are interested in the meat industries from counties adjoining Lancashire. Medical officers and veterinary inspectors will be invited, as well as representatives of the Manchester and Salford Municipalities.

The importance of this demonstration may be gathered from the fact that Salford is one of the largest live stock markets in England, as may be judged from the fact that during last financial year the numbers of animals which passed through it were: Cattle, 109,471; sheep, 614,725; calves, 7,510; pigs, 245.

The arrangements are under the charge of Mr. Councillor Fisher, Rillbank Terrace, Edinburgh, who arranged the many details in connection with the Edinburgh demonstration.

"ENCEPHALIC EMBOLIC STRONGYLOSIS" OR "ENCRANIAL STRONGYLGENIC EMBOLISM"

By Dr. BURTON R. ROGERS.
Veterinary Surgeon, Riley County, Kansas.

Following a very extensive reading of the exhaustive work done on the human brain and its diseases, I am convinced the symptoms of the Kansas horse plague and the lesions so far as they were observed, coincide *exactly* in every way to embolism of certain terminal arteries of the brain. Every broad-minded and fair man who will deeply pursue this same literature cannot help agreeing with this fact.

The extraordinarily ideal conditions of climate favourable at the right time for the preservation and perpetuation of certain stages of the *Strongylus armatus* resulted in an unusually large number of their larvæ in the intestinal tracts of the horses in the infested districts. This in turn means a proportionately large number entering the submucosa and subserosa for the encystment stage. This in turn is followed by proportionately greater numbers following their well-known perverse habit of burrowing up the loose great mesentery and burrowing into the wall of the tough great anterior mesenteric artery, and other vessels,

increase their opportunities to enter the lumen of the vessels and into the free stream.

This does not state or even imply that other causes cannot or do not produce exactly the same symptoms also. It merely serves to broaden the thought and increase the channels.

The moment the parasite enters the liquid of an artery, vein or lacteal it fulfils the definition and is an embolus.

There are *eighteen* different vessels by which they may enter the cranial cavity, and just *one* parasite, no matter whether it is one out of thousands or one out of less than ten, when in the right place is enough to produce embolism of the brain.

If the above two conditions or facts co-existed, it is plain and as accurate and positive as 2 plus 2 is 4, and it would be absolutely impossible for anything but that disease to follow.

This does not state or even imply that other causes may not produce the emboli, such as bacterial agglutination, bacteria, moulds, toxins, clots, &c.

I am told the King of Italy once knighted a man in the nineties who had "discovered" the *Bacillus icteroides* to be the cause of yellow fever. But a few years later it took the risk and loss of the lives of Reed, Carrol, and Lazear to prove that he was *wrong*, and that the absolutely *necessary factor* was the mosquito.

Volumes and volumes of "scientific" material were written upon yellow fever and an indefinite "miasma." But one correct sentence regarding the mosquito and yellow fever is worth more than all the volumes and records of previous research and theory.

If gold is on the east side of a river and none on the west, a thousand men digging and searching on the west will *never* find the gold, but one man not even looking for it could accidentally tumble upon it on the east. And so the search for the cause of disease, the river or dividing line between plant and animal life may be important enough to stampede across.

We now enclose "miasma" which no one ever saw in quotation marks, and I am confident that some of the causes, including "mould" in connection with the Kansas horse plague, will some day be similarly written.

Inasmuch as the positive essential specific cause of the recent Kansas horse plague has not thus far been satisfactorily demonstrated to all, and therefore not entirely agreed upon, the field

is still open for the study and consideration by all broad-minded scientific veterinarians and others of all the plausible and well grounded theories.

One or more of the theories already presented is probably correct. If not, however, one of them or a combination of them may lead to work that will ultimately solve the problem. For every "*why*" in Nature, there is a "*reason.*"

After extensive reading and thought along certain lines during the past few months, I am convinced the *Strongylus armatus* is the most destructive enemy extant of the farm horse in certain climates and seasons—but for reasons that have not been given heretofore or suspected even.

Still my theory was and is based upon observed facts in connection with the outbreak, together with scattered and *unconnected* but *recorded facts* in anatomy, biology, and pathology. I do not ask anyone to agree with the theory I evolved from these observations and facts. All I ask is that the facts be considered and the theory be eliminated only by further investigation and experiment—and not by *opinion* alone.

I venture to say without fear of contradiction that there does not or never did exist an expert veterinary neurologist. Neither does there exist a veterinarian who is an expert specialist and sole investigator of helminthology. Outside of the anatomy lecturers, there are very few men who know both surgical and medicinal veterinary anatomy, or rather exact anatomy, or who can see the blood-vessels and the circulating medium with an X-ray eye. I am sure there is no veterinarian who combines all these fields as a joint specialist. Yet I firmly believe the cause of this disease will be worked out by combining and interlocking existing knowledge within these three fields of science, together with a slight additional knowledge that will come from future research.

Neurological Facts.

(1) In the cranial cavity are nuclei or nerve centres or collections of nerve-cell bodies in certain masses or areas, that have specific definite control over certain functions of the entire bo-ly. The most vital centres are located in the medulla oblongata. The respiratory centre, the vasomotor centre, the cardiac centre, the *deglutition* centre, the urination centre, and the centres or nerve-cell bodies of the last eight cranial nerves, together with

the trophic or nutritional nerves of all the above, are all located in the medulla. In addition to this, the nerve-fibres or tracts from every other centre in the brain pass *through* and become a part of the medulla as they pass out of the cranial cavity to their ultimate destination.

(2) Blood (together with whatever foreign matter or bodies it may carry in solution or suspension) can enter the cranial cavity by eighteen different vessels, or nine pairs, as follows: internal carotids, vertebrals, occipitals, middle spinal, ophthalmics, mastoids, spheno-spinous or great meningeals, and two branches of the prevertebrals. The last five pairs supply the meninges. The first four enter the circle of Willis at the base of the brain. In the human brain (and probably quite similarly in the horse) eighteen named pairs of intrinsic *terminal* arteries pass up from the circle of Willis and from the basilar artery to supply isolated and definite areas of the brain and of the medulla.

(3) A terminal or end artery is an artery supplying a certain definite cone-shaped or wedge-shaped or tree-shaped area, and has absolutely *no anastomosis* of any kind with any other artery. Therefore it is the *only* artery supplying that particular area with nutrition and life.

(4) Terminal arteries are found in the kidneys, in the spleen, in the lungs, and in the *brain*, the last being the most delicate and important organ of all.

(5) When a terminal artery is ligatured or plugged or occluded in *any* way, the blood supply and nutrition of that part of the wedge-shaped areas is cut off, and the function of it is impaired or *destroyed*, and an infarct is produced. Conversely, terminal arteries are found wherever infarcts are found. Infarcts may be anæmic or hæmorrhagic, sterile or infected.

(6) An embolus is *any* foreign body of *any* kind, animate or inanimate, suspended in and floating free in the blood-stream and in *any* blood-vessel. (Therefore it may be a parasite in any stage.)

When an embolus reaches an artery or arteriole smaller than itself, it completely or incompletely occludes and plugs that artery. Its presence may irritate the surrounding tunica intima and complete the occlusion by thrombus formation. The degree of damage depends, *first*, upon the kind and importance of the

tissue supplied by the artery, and *second*, upon whether the embolus was sterile or infected with pathogenic organisms.

Plugging an inosculating or anastomosing artery is of little consequence, as its companion arteries soon compensate for its function. But if a *terminal* artery is plugged, impaired nutrition and function and ultimate destruction rapidly occur. If a terminal artery of the spleen, kidney, or lungs is plugged, it is also comparatively inconsequential, for an animal can live after the spleen has been removed, and it can get along with less than one kidney, and with less than one lung. Parts of the brain, and particularly the cerebrum, have been congenitally absent, or may have been extirpated surgically, or destroyed pathologically, and the person still live.

But there are certain parts of the brain, particularly the medulla, supplied from the basilar artery by *terminal* arteries, emboli and plugging of which produce sudden, serious, profound disturbances of wide extent and variations, yet symptomatically uniform within certain limits.

Sterile emboli mechanically injure—but if they are in addition also infected, the degree of damage is much greater when pathogenic or even saprophytic bacteria are brought to the injured area. Nature's forces are impaired. Many surgeons prior to an operation give their patient a pre-operative bacterin treatment, so as to fortify and help Nature to help the surgically injured area to overcome possible infection. Therefore injury due to emboli and infection *bacterins* are positively indicated.

(7) Human researches record the symptoms of brain embolism in the medulla as including the following: (1) Inability to swallow, ninth cranial. (2) Impaired speech, twelfth cranial; grinding teeth, fifth unopposed by seventh. (4) Paralysis of facial muscles, seventh cranial; dizziness and impaired hearing; eighth cranial; irregular pulse, cardiac, vagus, and vasomotor centres. (7) Retention of urine. (8) Hemiplegia and tendency to fall in one direction or to go in a circle. The last may follow emboli farther up in cortex and motor areas of the cerebrum and cerebellum.

Helminthological Facts.

(1) Zoologically, worms and insects are closely related, differing mainly in insects having articulated limbs, while the vermes have none.

Certain insects are known to be the hosts and the carriers and the necessary factors in the causation of certain diseases.

Worms are divided into platyhelminthes or flat worms, and nemathelminthes or round worms. The flat worms are flat, are hermaphroditic, having both sexes in the same individual, and they have *no digestive tract*. The food passing through their integument is probably as sterile as the food passing through our intestinal mucosa into the submucosa for absorption.

Round worms are cylindrical; they have separate sexes, therefore males and females; but above all, they *have a distinct digestive tract*. Their digestive tracts probably contain a bacterial and protozootic flora as varied as that of the intestinal tract of the animal they inhabit.

(2) Nematodes or round worms are divided into five families, three of which, the Filaridæ, the Ascaridæ, and the Oxyuridæ, are *not* blood-suckers in the adult stage, and whose larvæ *do not* burrow out from the intestines into the tissues, and are therefore comparatively harmless.

The other two families, the Strongylidæ and the Trichotachelidæ, *are* blood-suckers when adult, and their larvæ *do* migrate from the intestines and *do burrow* into the various tissues and current vessels, and are thus damaging and dangerous. In my estimation they are much more damaging and injurious and devastating than has ever been suspected, and in ways that have never been thought of.

(3) The Strongylidæ family includes the famous hook-worm of the South and the Tropics, and only recently recognized as destructive; it includes also the gape-worm of chickens, the *Strongylus paradoxus* of hogs, the hook-worm of the dog, the stomach or wire-worm of the sheep or ox, and the *Strongylus armatus* and *Sclerostoma tetracanthum* of the horse.

(4) In each of the above hosts there are one or more incompletely understood diseases, all fundamentally alike, and all nervous in character.

In man there is cerebrospinal meningitis, infantile paralysis, pellagra, together with certain forms of insanity, epilepsy, blindness, loss of speech, loss of hearing, apoplexy, &c., and "infectious anæmia." In chickens there is apoplectiform septicæmia and limber neck; in hogs there is hog cholera, swine plague, and paraplegia; in dogs there is rabies of the acute, violent, and

dumb types; in cattle there is so-called cornstalk disease. In horses there is cerebrospinal meningitis, cerebritis, leuco-encephalitis, blind-staggers, stomach-staggers, forage poisoning, "mould" poisoning, smelter-fumes poisoning, loco disease, Borna's disease, some forms of influenza, and a host of others. Besides these, there is swamp fever and infectious anæmia, the effects of the adult worm sucking blood.

Helminths belonging to the same zoological family must be quite similar, within certain limits, in their biological features. Facts have been worked out concerning some that have not been in others. It is fair to assume similarities because of the family.

Males and females copulate. Thousands of eggs are produced. The eggs are usually passed out with the fæces after being passed out by the female into the intestinal tract of the host. They usually do not hatch until they reach the exterior.

(5) According to the 1908 B.A.I. Report (page 270), the adult females of the *Strongylus contortus do* produce thousands of microscopic eggs that pass out unhatched with the fæces of the sheep. In a few hours even, or days or weeks—*depending* upon temperature and moisture—the eggs hatch into tiny embryos and undergo development. Drying and freezing will kill both eggs and embryos. The embryos (also of liver flukes) crawl up moist grass blades, when the humidity is sufficient and the temperature above 40 degrees Fahrenheit, and encyst on the grass. Conditions known to favour "mould" formation are also just as positively optimum for the out-of-the-host- or out-of-doors-stage of helminths.

(6) The cysts are taken in on the grass blades or "forage" by sheep.

(7) More water than the highest degree of humidity will destroy the egg stage of the human hook-worm. Rain must therefore be detrimental.

(8) The larvæ of the human hook-worm are said to pass through the soles of the feet, then enter the circulation (if so, they positively become emboli) and reach the lung (may they not reach other organs?), and are coughed up from the lungs and swallowed, and in this way reach the intestines. Personally, I do not believe that is correct. I believe contaminated vegetation or water is the channel and vehicle.

(9) It is classical knowledge that one stage of the liver

fluke passes through the body of the snail as an intermediate host. One stage of the *Echinorhynchus gigas* passes through the grub-worm. The earth-worm is said to be the intermediate host of the gape-worm.

(10) The *Trichina spiralis*, belonging to the Trichotrachelidæ family, passes no essential part of its life cycle outside of the animal body or animal tissues. The encysted larvæ are taken into the intestinal tract, where they rapidly develop into adult males and females, which immediately copulate. The male dies. The females stick their heads in the crypts of Lieberkuhn, suck blood, and in a short time hatch out about 1,500 living embryos or larvæ each.

There are no eggs passed out by the adult female Trichinæ, or with the fæces of the host. The larvæ immediately burrow through the mucosa into the submucosa and subserosa and enter the lacteals and veins.

(11) A large number of parasites, whether brought forth as living young from their mothers into the intestinal tract of the host, or whether taken in in the form of eggs or other form of encystment, and then become larvæ or embryos, *do* burrow through the mucosa into the submucosa and subserosa and thence into the lacteals and circulation.

This is true of the *Trichina spiralis*, the *Echinococcus*, the *Cysticercus cellulosæ*, the *C. bovis*, *Cœnurus cerebralis*, the gape-worm, the *Œsophagostoma columbiana*, the *Strongylus armatus*, and *Sclerostoma tetracanthum*, and the human hook-worm.

(12) Sometimes the proglottides or ripe segments or eggs of the *Tænia solium* and *T. saginata* of man may, by retrograde peristalsis, pass backwards from the large intestines back into the small intestines, and even back to the stomach. The intestinal and gastric juices then dissolve the shell and hatch the embryo in exactly the same way the hog or ox would have done. The embryos then pass into the submucosa of man, and by the circulation may reach any part of the body, particularly the brain, and encyst in the larval form. It is auto-infection.

Interposed Anatomical Facts.

(1) The small intestines of the horse are about 72 ft. in length and the large about 25 ft. You know this; but stop and realize it in connection with this problem. The mesentery

that suspends the intestines to the sub-lumbar region is a *huge* triangle having a base between 70 and 100 ft. in length, and an apex around the tough, thick-walled great anterior mesenteric artery. More important yet to consider in this important apex is the thin-walled portal vein formed by the union of all the veins coming from the 100 ft. of intestines at the base of the triangle. There is also the extremely thin-walled receptaculum chyli, formed mainly by the union of the myriads of lacteals that come from this same 100 ft. at the base of the triangle. There is also the important semi-lunar ganglion or *abdominal brain*, containing most of the cell-bodies of the myriads of sympathetic sensory nerves coming from the intestinal mucosa, and also most of the cell-bodies of the myriads of motor, secretory, and trophic fibres of the solar plexus going to the intestines to control peristalsis, secretion, and nutrition. The thin-walled posterior vena cava is also placed at this important apex. All literature confines itself to the less important thick-walled anterior mesenteric artery, and very little attention is called to the other more important centripetal structures.

(2) The two peritoneal layers of the mesentery are united very closely by loose, soft, easily penetrable areolar tissue. The two layers are also quite widely separated at the line where they envelop and suspend, or are attached to the concave side of the bowels' upper surface. This is therefore an extremely favourable place for the vermicular burrowing of the larvæ and embryos of parasites, and they may quickly reach the important apex. They may also enter the walls or the lumen itself of the arteries or the centripetal veins and lacteals. The blood in the mesenteric arteries is centrifugal and goes *to* the intestines. The blood in the mesenteric veins and the lymph in the lacteals is centripetal and going *away* from the intestines *to* the apex in the sub-lumbar region. The receptaculum chyli, by means of the thoracic duct, empties directly into the lower part of the jugular vein and anterior vena cava, and no lymph nodes are interposed. The anterior and posterior venæ cavæ empty directly into the right auricle of the heart. The blood of the portal vein must pass through the capillaries of the liver first before it empties into the posterior vena cava. From the right side of the heart all this material must pass through the capillaries of the lungs. The lung has terminal arteries, but elastic ones. The blood is carried

back to the heart from the lungs. The blood and whatever it may contain is sent by the heart to *any* part of the body.

The blood of the vena cava and the lymph of the receptaculum chyli, together with whatever emboli they may contain, pass through only *one* set of capillaries, namely, of the elastic lungs, before they reach the common aorta or beginning of the great systemic circulation, the blood of the portal circulation having to pass through the capillaries of the liver in addition.

(3) The venous blood from the entire nasal chamber, and all of the venous blood from the hard palate and from the soft palate, and part of that from the tongue, and part from the face, and all that from the eye and eyeball, *must* pass through the *cranial* cavity by means of the ophthalmic vein at the alveolar tuberosity and orbital hiatus. The ophthalmic vein enters the ophthalmic foramen into the cranial cavity and joins the cavernous and sub-sphenoidal venous sinuses. Therefore inflammation of the brain and meninges, bringing about increased fluid and exudation, results in pressure upon this vein, and passive congestion follows in the tissues of the drained areas.

Additional Helminthological Facts.

(13) The immature form of the *Strongylus armatus* is very commonly found in the intestinal tract of the horse. Between the egg stage and the adult stage it is self-evident that there is a time when it is the exact size of the so-called adult stage of a parasite that has been described and called the "*Sclerostoma tetracanthum.*" There is some question as to whether such a parasite actually exists, and that the larval form of the *S. armatus* has been erroneously thought to be, and described as a distinct species. There is absolutely no question that because the larval stage of the *S. armatus* is at some time and stage exactly equal in size and appearance to the so-called or described *Sclerostoma tetracanthum*, that this mistake has been often and repeatedly and unconsciously made by practitioners and others, "experts" sometimes.

Even if there are seventeen or more species of these found in the intestines of the horse, and their larval habits the same as given below, the results would be the same.

(14) The *S. armatus* (and the tetracanthus as well) *does* enter the submucosa and subserosa. It also *does* burrow into the

tough wall of the anterior mesenteric artery and other arteries. It also passes through the walls of the artery and sticks free into the lumen. Does it ever let loose and get into the blood-stream?—Yes, most emphatically, yes.

(15) Neumann's 1892 edition of "Animal Parasites" records the larvæ of the *Strongylus armatus* as having been found in the following places: the intestinal lumen, the intestinal walls, the mesenteric, cœliac axis, spermatic and renal arteries, and the aorta, in the peritoneal cavity, in the muscular and connective tissues, in the liver, in the lungs, in the kidneys, in the scrotal sac, in the cryptorchid testicle, and in the *brain*. The cases he records where it was found in the brain showed symptoms exactly similar to those in the Kansas horse plague. No one can afford to neglect to read that paragraph on p. 727. I myself have seen in a dissecting subject an aneurism at the termination of the common carotid artery, and the internal carotid completely occluded. These are positive evidences and proof of the wandering character of strongyles. The commonness of the parasite in the intestines and mesenteric arteries is no proof against its occasional presence and seriousness in the brain.

Dr. James Law says, on p. 5, vol. v.: "Given a real parasite with injurious qualities, the aggregation of a large number of the animals forming its natural host, and *an environment especially favourable to its preservation* and propagation, we must be prepared to meet with an extensive, dangerous, and destructive outbreak of which no previous counterpart is known. No previous immunity, and no history of this parasite showing an *apparent harmlessness*, must be allowed to *blind* us."

Kansas Epidemiological Observation Facts.

Observation Fact (1) In the infested territory there *was* a period of very hot, muggy, humid weather, favourable to crops of all kinds, and particularly to "moulds" and the atmospheric egg and embryonic stage of parasitic worms.

(2) An extraordinarily large number and grand total of the infestuous stage survived in the pastures (*on* the grass (?), forage (?), or *in* the water (?)).

(3) A correspondingly greater grand total were ingested.

(4) It followed that an extraordinarily greater grand total of the *larvæ* of the *S. armatus* were found in the intestinal tracts of both the healthy and sick horses in the infested districts.

(5) A correspondingly greater grand total naturally entered the submucosa and subserosa.

(6) A correspondingly greater number and grand total entered the tough, thick anterior mesenteric artery walls.

(7) A correspondingly greater grand total could, and no doubt *did*, enter the lumen of the thin-walled centripetal veins and lacteals.

(8) The larvæ of the *S. armatus were positively found* in the withdrawn blood by several investigators.

(9) A correspondingly greater increase in the grand total of larvæ in the blood-streams of the horses in the infested districts means the correspondingly greater increase of the grand total of *emboli.*

(10) A correspondingly greater grand total reached the *terminal* or end-arteries of the lungs and kidneys, impairing correspondingly greater numbers of small areas of the lungs and kidneys. (The pneumonias and nephrities were common and influenzal symptoms also.)

(11) The increased grand total in the blood and in the lungs increased the opportunities for a greater grand total vermicularly, working their way through and stretching the elastic capillaries of the lungs into the veins and thence to the common aorta.

(12) Correspondingly greater grand totals in the common aorta increase the opportunities for one or more *larval emboli to reach the cranial cavity by any one of the* eighteen branches entering it.

(13) *All* of the horses showed positive symptoms of *brain embolism.*

(14) Many of the horses showed symptoms of pneumonia and nephritis.

(15) A diplococcus or streptococcus, or pasteurella or pneumococcus, was found in the cerebro-spinal fluid and urine and other fluids in some of the cases by some of the investigators.

(15*a*) If one would take a handful of the intestinal contents from the horse, dissolve in water, and then plate it out in the form of a culture medium; then take pure colonies, and inject them into the cerebro-spinal fluids, or possibly into the jugular, they might be able to produce meningitis from several of the colonies, for there are several kinds of infectious meningitis.

(16) The intestinal tract of the equine host, and therefore

the intestinal tract of the adult and larval Strongylus, is *not* sterile, but has a flora.

(17) Combine Neurological Fact 6, Helminthological Fact 1, Observation Fact 12, Observation Facts 13, 14, 15 and 16.

(18) In most cases there *was* paralysis of the intestines and no peristalsis. Could the larvæ have burrowed into the semilunar ganglia of the solar plexus and, irritating the nerve-cell bodies, impair their function?

(19) In many cases there were symptoms of compression of the ophthalmic vein, and congestion of the eyes, mouth, and face. (Anatomical Fact 3.—Influenzal symptoms.)

(20) There was inability to swallow, and paralysis of the deglutition centre. (See Neurological Fact 7.)

(21) There was often paralysis of the facial muscles, seventh cranial.

(22) There *was* grinding of the teeth. The fifth nerve, closing the jaw, was unopposed by the paralysed seventh that opens the jaws.

(23) Animals turned or leaned to one side, or forward or backward, showing evidence of paralysis of muscle groups—hemiplegia.

(24) Hundreds of lines of treatment were adopted, and many kinds were advocated in the public press.

(25) Very prominent among the lines of treatment advocated was vermicidal, vermifugal, purgative, and laxative treatment.

(26) The first two official reports given out from the Live-stock Commissioner's office advocated vermifuges. The same was copied by hundreds of papers and read by thousands. The *Topeka Capital*, and the *Farmers' Mail and Breeze*, and the *Kansas Farmer* advocated super-heroic doses of aloes (1 oz.), and copperas in addition.

(27) As a result of the above, thousands of doses of worm drugs and vermifuges and cathartics were administered to healthy horses.

(28) As a result of the above, millions of the larvæ of the *S. armatus* were removed from the intestinal tracts of the horses in the infested district, and the dangerous grand total decreased.

(29) As an additional result of the doses of vermifuges, all the good ones being also good purgatives, the total quantity of ingested poison was reduced, whether it was germs, moulds, chemicals, toxins, or *worms*.

(29*a*) Many of the horses that were said to have died from mechanical pneumonia due to drugging had the cause of the pneumonia in multiple pulmonary emboli and infarcts instead.

(30) Thousands of horses were removed from the pastures during the right period, and thus reduced the quantity of poison ingested. There is no proof that this removal was not from worms as well as other poisons.

(31) The infested territory was blessed with a good rain and drop in temperature. (See Helminthological Fact 7.)

(32) No excessively and prolonged humid atmosphere followed.

(33) The disease abated, and is practically gone now.

UNANSWERED QUESTIONS TO BE SOLVED.

Question 1.—Has the complete life history of the *S. armatus* been thoroughly and accurately worked out, or merely theorized out in parts?

Q. 2.—Do the Strongylus eggs ever hatch in intestinal tract of the host?

Q. 3.—What time of the year are the greatest number of eggs passed out?

Q. 4.—What are the optimum soil, atmospheric, temperature, moisture, and forage conditions most favourable to the preservation and perpetuation of the greatest numbers of the *S. armatus*?

Q. 5.—Have the Weather Bureau records been consulted and considered and compared prior to and during outbreaks of cerebro-spinal meningitis and the other epidemics of the horse and other animals?

Q. 6.—Does the *S. armatus* require an intermediate host?

Q. 7.—*If* an intermediate host is required, what is it, and what are the optimum conditions favourable to it?

Q. 8.—Are the eggs in the infestious stage for other or the same horse *immediately* after being passed out?

Q. 9.—Do the eggs hatch out of doors—in the manure, soil, or water?

Q. 10.—How soon after being passed out do the eggs hatch and the worm reach the *infestious* stage?

Q. 11.—When they *do* reach the infesticus stage, is it *in* the water, *on* the grass or forage—or where?

Q. 12.—Is the infestious stage in the pasture microscopic or macroscopic?

Q. 13.—How soon after being ingested in the infestious stage by the horses are they hatched or developed to the pathogenic stage?

Q. 14.—How large is the hatched embryo or larva?

Q. 15.—How large is the embryo or larva when it is first ready to and does burrow through the mucosa?

Q. 16.—What is the anatomical and physiological character of its burrowing apparatus and its possibilities?

Q. 17.—How large are the embryos or larvæ *when* they become *emboli*, or may they vary?

Q. 18.—Being elongated and animate when they reach the capillaries, can they elongate and attenuate themselves, and stretch the capillaries and pass beyond into the larger venules, particularly in the lungs?

Q. 19.—Can they do this in the terminal arteries of the brain, and soon enough before destruction of tissue and recovery occur?

Q. 20.—When caught in a capillary, can they burrow out through the wall into the tissues and thence into a larger vessel?

Q. 21.—When caught in an artery, can the larvæ be attacked and destroyed by leucocytes?

Q. 22.—Will coiled up larvæ occlude larger vessels than when straight?

Q. 23.—*Can the larvæ carry bacteria, protozoa, &c., from the intestines of the horse to any part of the body by means of its own digestive tract?*

Q. 24.—Can the adult female of the *S. armatus* be oviparous in the summer and viviparous, like the *Trichina spiralis* and other vermes, in the winter? This based on atavistic principles of the evolution of family.

Q. 25.—Would not such larvæ, hatched in the intestinal tract, burrow into the tissues like the *T. spiralis* and summer strongyle?

Q. 26.—When horses are fed on poor, innutritious food, or mouldy corn and stocks in the winter, can retrograde peristalsis force the eggs back into the intestines or stomach in immense numbers and *then* hatch them into larvæ?

Q. 27.—Or can the adult female, ripe and ready to hatch her eggs, be passed back into the stomach and intestines, and then hatching, bring about *auto-infection* with larvæ or eggs in the dead of winter?

Q. 28.—Does poor innutritious food and constipation force

the female to migrate for better food back into the more anterior parts of the digestive tract? (See *H.F.* 12.)

Q. 29.—Were the general rains all over Kansas and the infested territory about September 18 destructive to the eggs or larvæ and the infestious stage, and does this explain and account for the disease subsiding?

Q. 30.—Is anyone in a position to say under oath, based on sufficient investigation, that the removal of the horses from the pastures did not remove them from the infestious stage, from a probable positive infestious stage of a destructive worm, as well as from a "possible" mould, chemical or bacterial poison?

Q. 31.—Until the specific destructive agent and its method of pathogenicity has been positively proven, can anyone say it was *not* the *S. armatus?*

Q. 32.—Is there anyone in a position to say that the opinion and advice regarding worms, and their methods of elimination and prevention, that was published broadcast, and that was followed by the administration of thousands of doses of effective worm medicines that were also good purges for healthy horses, *was not the* GREATEST *of* ALL *the factors in reducing the deaths?*

Q. 33.—Can anyone deny that such advice and its practice did remove and decrease the total quantity of poison, whether chemical, mould, or germ?

Q. 34.—Was the proper technique carried out by anyone to determine whether the larvæ had become encephalic emboli?—No; positively *no*, so far as I know.

Q. 35.—*What is the proper technique that ought to be adopted to determine the presence or absence of encephalic larval emboli? That is the principal object of this paper.*

By the time I had evolved my theory, and by reading had confirmed it, and had worked up a technique that might prove it, it was too late, and conditions arose that made it impossible for me to do so.

In the past we have *overlooked* this etiological theory because it did not exist as a theory, but any veterinarian or scientist in the public service anywhere, who reads this and the literature upon brain embolism of the human, will probably not *ignore* it in the future until disproved. Should the disease ever become epidemic or endemic anywhere again, I trust those who have the inclination, time, funds, and liberty to do so, will make observa-

tions and conduct proper investigations so as to determine the positive facts.

I suggest that first of all the blood of the moribund be drawn into a sodium fluoride or sodium citrate or potassium oxalate solution so as to prevent clotting and enmeshing the larvæ, and then strain it through cloth to determine the possible presence of larvæ in the free blood at that particular moment as circumstantial evidence.

Secondly.—After bleeding expose both common carotid arteries immediately after death, and inject toward the head a coloured fine injection mass mixed with formaldehyde and glycerine.

Then remove the brain very carefully by removing the *floor first*, and thus preserve all the vessels that enter at the base.

Never remove the roof first, and then pull out the brain, rupturing the vessels passing through the foramina at the base. This suggests an additional question: How many brains were removed, and of these was a single one removed by taking the base off first?

It might be well to precede the injection with a washing out of all the cephalic vessels with a normal salt solution. Afterwards follow each artery and twig until a place or places are found where the injection material stopped and did not go beyond. Examine this point carefully in the *interior* of the vessel for an embolism.

I suggest that a very careful clinical study, note, and record be made of the symptoms before death just exactly as an expert human neurologist would do. They can locate the exact spot of most brain lesions before death. If my theory is correct we may often be able to prophesy the same from the symptoms.

Experience may suggest improvements in the technique.

There is an opportunity here for a great work for the horse and humanity that may lead to lines of work that may solve the mysteries the investigators admit surround the sources of infection and the methods of transmission of human cerebrospinal meningitis, infantile paralysis, pellagra, rabies, and some other diseases, and thus be the means of *saving thousands of human lives*.

Whether I am right or wrong, I maintain this is sufficient defence for the writing of this article.

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(2) "Reference Handbook of the Medical Sciences" (borrow from an M.D.), vol. ii, "The Brain," pp. 136 to 147, and 766 to 779.
(3) Neumann's "Parasites" (old 1892 edition), pp. 727, 771, 768, 704, 675, 656, 622, 631, 611, 547, 500 (403, 410), Nen.
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(5) B. S. Bur. Animal, Ind. Reports, 1901, pp. 183, 219; 1908, pp. 270, 239, 247, 220.
(6) B.A.I. Bulletin 36, p. 9.
(7) Dr. Law, vol. v, pp. 4 and 5 sure, and also 273; vol. ii, p. 215, line 4.
(8) "The Abdominal Brain," by Byron Robinson.
(9) Any anatomy of the intestines, lacteals and receptaculum chyli, the portal vein, the posterior vena cava, and mesenteric arteries, and the circulation of the brain.

[In our next issue we shall publish a criticism of Dr. Burton Rogers's article by Professor James Law, F.R.C.V.S.—Ed., V. J.]

ROYAL COLLEGE OF VETERINARY SURGEONS.

Fellowship Degree.

A meeting of the Board of Examiners for the Fellowship Degree was held at the College, 10, Red Lion Square, W.C., on Saturday, May 17. The following is a list of the successful candidates, together with the titles of their respective theses:—

Alexander Crabb, "The Veterinary Surgeon and his relation to the Refrigerated Meat Supply."

Wm. Lancelot Little, "Periodontal Disease of Horses."

J. R. Hodgkins, "Rinderpest in India."

W. Ashe King, "Foot-and-mouth Disease."

The Examiners were Messrs. J. Malcolm, W. Hunting, and Professor J. Macqueen; Mr. W. J. Mulvey being in the chair.

PERSONAL.

Mr. Arthur Dunbar Morgan, M.R.C.V.S., D.V.H., has been appointed Assistant Veterinary Officer to the City of Sheffield.

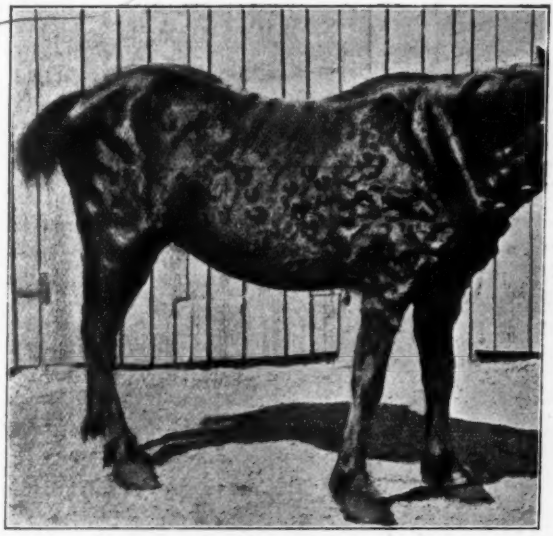
Clinical Articles.

LYMPHADENITIS AND MULTIPLE CUTANEOUS TUMOURS IN A HORSE.

By A. KRAGERUD.

The horse illustrated, with the numerous nodules of the lymphatics, presented the following appearances:—

The affection on superficial examination had a similarity to glanders. The horse was covered all over with a number of round nodules, partly arranged in ranks, of the size of a hazel nut to a walnut. There was a greyish serous discharge from both nostrils, and on the wall of the nostrils little round raw surfaces. The



appetite of the animal was good; there was no fever, and the general condition was unaffected. On *post-mortem* the raw surfaces, somewhat inflamed, were seen on the nasal mucosa. All the lymphatic glands of the body were swollen. There were no other anatomical changes. This disease commenced three years previously, according to the owner. At this time it had been treated for slight strangles by a veterinary surgeon. Then

some little nodules formed under the skin; these increased from time to time in number and size, and for about a year there had been nasal discharge. During the last three months the nodules and discharge had both increased considerably. Apparently a lymphadenitis was present.—*Deutsche tierärzt. Woch.*

SARCOMA OF THE STOMACH IN THE HORSE.

By Chief Veterinary-Surgeon MULLAUER.

A seventeen-year-old service horse, called "Nichte," of the 4th Squadron of the 2nd Regiment of Hanover Dragoons, which was always a good eater and had done good service, was reduced during last year almost to a skelton, finally refused all food, and became dull and apathetic. Different cures were tried without effect, and even after eating well occasionally no improvement occurred.

The horse was cast from the regiment and slaughtered at the Lüneburg abattoir.

On *post-mortem*, as a cause of the disease, a pathological degeneration of the stomach was revealed.

This organ was about half as big again as normal and showed externally elevations as large as a child's fist between which deep incarcerations were present. On pressure it was hard in some places and fluctuated in others.

On opening the stomach at the great curvature a litre of yellowish-white thick pus escaped which had no smell; after its removal the cut surface of the stomach wall showed a fatty greyish-yellow appearance. The walls of the stomach were thickened and its lumen obliterated. From the thickened walls numerous fistulous openings containing pus radiated. The fistulas led into the submucosa. The mucosa at the entrance of the œsophagus, as well as at the exit of the duodenum, was punctured like a sieve.

The affection was ascribed, after examintion at the Berlin Pathological Institute, to a sarcomatous degeneration of the stomach.—*Zeitschrift für Veterinärkunde.*

CLOUDINESS OF THE LENS AND CIRCUMSCRIBED PUNCTIFORM CONJUNCTIVITIS CAUSED THROUGH AN INJURY.

By Staff Veterinary-Surgeon KRAEMER.

At the beginning of May, 1912, an officer's horse, which the owner had had in his stable for several years, was sold to an infantry officer. The horse was examined by me at the time and both eyes passed as all right.

Nine days afterwards the buyer sent word that the horse was suffering from periodic ophthalmia, on which account he placed it at my disposal. Thereupon the horse was immediately fetched back and once more examined, when the following condition was noted.

On the conjunctiva there were two punctiform greyish white irregular-shaped spots, the surface of the cornea was quite smooth. The iris and lens showed no pathological changes; further, there was no sensitiveness to light and the two eyes did not differ from each other in size.

With the ophthalmoscope streaky and punctiform opacities running in opposite directions could be seen in the rather fluid contents of the lens; these were rolled up like sediment at every movement of the eye. Sight tests appeared to show both eyes to be normal. Since every internal inflammation of the eye is now classed as moonblindness, there was no contesting the matter from a forensic point of view. It was remarkable, however, that on examining the horse at the time of sale and also the year previously, nothing wrong had been noticed with the eyes. The horse had been sent here by road and thence to an outlying garrison, and a few days later had been transported to the training ground, and as the result of a blow in the eye these changes had developed. The presence of an abrasion three fingers breadth behind the affected eye, which was not there previously, pointed to this. Since in men a blow in the eye produces such cloudiness of the lens, which is brought about by small hæmorrhages and can arise in a few days, so in this case such a cause must be accepted, and that this was so was confirmed by the fact that the spots on the conjunctiva and the cloudiness of the lens both completely disappeared in ten days without any treatment.—*Zeitschrift für Veterinärkunde.*

ON THE EFFECT OF CARBON DISULPHIDE ON GASTRUS LARVÆ INVASION.

By Staff Veterinary-Surgeon DUILL.

In the spring of this year two five-year-old horses were brought to me which frequently passed gastrus larvæ in the dung. Gadfly larvæ occur actually only in grazing animals. They take the parasite up from the eggs deposited on the hair of the animal by the gadfly. The eggs, by licking of the coat, are transferred to the mouth and thence to the stomach. With the armed anterior end the maggot bores into the pyloric portion of the mucous membrane and remains there for about nine months, until its complete development. It was assumed that the two horses had taken up the larvæ in the summer of the preceding year and that the mature examples passed out with the excrement in the spring. On account of the quick following each other of larvæ a considerable invasion was feared. Practice teaches that gastrus larvæ are usually non-injurious parasites, and in spite of the frequency of their occurrence in the stomach of horses they only exceptionally cause illness. By great aggregation they may, however, give rise to digestive disturbances, emaciation, and colic, and if only few in number they may lead to abscesses in the stomach walls, perforation of the stomach and fatal peritonitis and by boring into the arterial blood-vessels cause hæmorrhage in the host. Also wandering of the larvæ occurs; they may cause symptoms of disease in the nasal passages, brain, bladder, and other places.

Arising from the foregoing I resolved to remove the larvæ with carbon disulphide. Each horse at night received an aloes ball after it had been dieted for a day, and in the course of the next day four balls of carbon disulphide in 10 grm. (about ʒiiss) doses made up in a gelatine capsule. The effect of carbon disulphide is rather alarming to those who see it for the first time. Directly after administration of the first dose severe colic occurred in both horses. They threw themselves down and rolled unceasingly in the straw for five to ten minutes; then they quietened down, and after a short time gave one the impression of being under a considerable dose of morphia. They paid no heed to commands and had to be shoved over if moved. Several times I noticed that one animal laid down

and appeared as if in deep sleep. After administration of the second dose, the same symptoms occurred. After the third dose the colicky symptoms were plainly weaker, and after the fourth remained almost completely absent. The narcotic symptoms had nearly disappeared two hours after the last dose. It was remarkable that the signs of colic were so violent after the first dose and quite absent after the fourth. I consider that the effect of the first dose was to cause the parasites to bore deeper into the mucous membrane in order to avoid the action of the drug and by so doing they caused the animal more pain. After the third dose only a few maggots clung to the mucosa, and after the fourth none at all. A tolerance of the mucosa to the action of the drug could not be accepted. On the subsequent days whole clumps of the larvæ were ejected. The carbon disulphide produced a good effect and the accompanying startling symptoms were without significance.—*Zeitschrift für Veterinärkunde.*

Canine Clinicals.

INTERESTING PARTURITION CASE.

By GUY SUTTON, F.R.C.V.S.

Kensington, W.

The power of resistance sometimes exhibited by the bitch at the period of parturition was well illustrated in a recent case.

One of the toy variety having congenital stricture was successfully mated after dilatation. At term the owner, having watched her with labour pains for some hours, became alarmed, and brought the dog for inspection, with the request that every endeavour should be made to obtain the puppies without resource to abdominal operation. On examination the whole vagina was found to be constricted, allowing barely the passage of a finger. The uterus was high up in the abdomen and had not "come down" at all. The membranes had ruptured. With some difficulty forceps were introduced and the head of a puppy seized and crushed, and an endeavour made to withdraw it. Some progress was made, and the puppy brought nearer to the vaginal outlet. After a further interval, hoping for some relaxation, and further conversation with the owner, consent was obtained

to perform a pan-hysterectomy. The bitch was chloroformed, and on opening the abdomen the peritoneal cavity was found to contain fœtal fluid, and a transverse tear of the floor of the uterus immediately anterior to the os about half an inch long was plainly visible. I presume this had been produced by traction on the fœtal head drawing the uterus unduly within the vagina. I do not think forceps would have caused a wound in this situation, nor would the direction of the tear have been transverse. The uterus, with its contents, was removed with ligatures in the usual way, and the abdomen flushed and cleaned with boiled water. The uterine stump was swabbed with tincture of iodine diluted with twenty parts of boiled water, as, although care had been taken in washing the hands and boiling the instruments, and the bitch had been douched with warm water containing perchloride soap, still it is more than probable that after a lapse of twelve to fifteen hours since rupture of the membranes the uterus contents were not free from contamination. The uterus contained one large puppy, and was devoid of any appreciable amount of fluid. Recovery was uneventful. This is, of course, not unusual in a pan-hysterectomy, but I think is somewhat remarkable when complicated by a ruptured uterus with escape of fœtal material. Within three weeks the bitch was on the show bench.

PARTIAL PARALYSIS AND DILATATION OF THE RECTUM.

By GUY SUTTON, F.R.C.V.S.

Kensington, W.

Within the last twelve months two cases of partial paralysis or dilation of the rectum have been brought to me. In neither was the sphincter muscle affected. Both had a similar history, and were clinically identical.

The dogs made frequent unsuccessful efforts to defæcate and strained persistently, occasionally passing a small motion with evident incomplete satisfaction. On digital examination the anus appeared to be normal. The rectum was dilated, filling the greater part of the pelvis, and firmly packed with semi-solid fæces. When these were removed the rectum contracted, but within a day or two the condition recurred, and the same process had to be repeated. If a purgative producing a marked action was given

then the fæces were voided. Neither case responded to treatment, which consisted of tonics and daily cold-water douches to the rectum. Are such cases common? I have not seen them described.

AN INTERESTING CASE OF CEREBRAL PARALYSIS.

By JAMES CHALMERS, M.R.C.V.S.
Government Veterinary Surgeon, Ermelo, Transvaal.

Date.—February, 1913, at Ermelo.

Subject.—Rough-haired Irish terrier dog.

History.—Was found by owner lying huddled up and apparently unconscious, with blood over the head and running out of nose. The day previous animal was quite bright. This particular dog was rather friendly with me, and was seen the night previous, when he was in good health.

Diagnosis.—Cerebral paralysis.

Prognosis.—Guarded, but, if anything, unfavourable.

Treatment and Remarks.—The dog on examination was found to be unconscious, affected with cranial hæmorrhage, epistaxis, and secondary paralysis.

Pulse weak, hardly perceptible. Temperature 100.6° F. After washing away all blood and carefully searching for cause of paralysis I was able to locate the entrance and exit of a small bullet, probably shot out of a B.S.A. air rifle. The entrance was on the right side of the median line on top and back of head where the occipital and parietal bones meet, and the bullet had apparently glanced through the skull to come out on the left of the median line just in front of the symphysis of the inferior maxillary bones. The right eyeball was distended, due to hæmorrhage, and the humours of the eye were suffused with blood.

I did not attempt to probe wound on account of the structures involved. The wounds (including the eyes) and surrounding areas were dressed during the whole treatment with an antiseptic consisting of 1 gr. chinosol to the ounce water.

Due to the coagulation of blood producing occlusion of the nasal chambers an inhalation was used of equal parts of terebine and tinct. benzoin co. (teaspoonful to the jug of boiling water),

and patient allowed to inhale fumes three times daily for ten minutes.

Internally a pill was first given consisting of hydrarg. subchlor. gr. iii; Podophyllin resin gr. ½; followed every two hours by—

℞ Pot. brom. ... ...
Ammon. brom. ... ...ãã gr. x.
Pot. iodi. ... ... gr. xx.
Liq. strychniæ ... ... ♏ ii.
Aq. ad. ... ... ʒ i.

Diet consisted of milk, eggs, Bovril, and arrowroot gruel. After two days the animal began to "show life" by endeavouring to raise its head—very unsteadily.

The treatment was then changed to the following mixture due to the hopeful signs of endeavouring to lap milk:—

℞ Acid nitro hydrochlor. dil. ... ... ♏ xlv.
Liq. strychniæ ... ... ♏ xlv.
Tinct. gent. co. ... ... ʒ iv.
Syr. aurant. ... ... ʒ i.
Aq. ad. ... ... ʒ viii.
ʒ ss ter in die.

In a few days the animal began to endeavour to move about, and if placed on its legs would try to walk, but the gait was very unsteady and uncertain, there appearing to be no control or co-ordination.

The dog was then put on raw minced meat and fed by hand. About fourteen days from when first seen the patient was taken into the open, and on being called made a gallant attempt to walk, but the peculiarities noticed were that the animal lifted the front paws high off the ground and generally collapsed to the right side.

The treatment was then to give three times daily after food one of Messrs. Burroughs Wellcome and Co.'s Tabloid Blaud Pill Compound No. 1, consisting of:—

℞ Pil. ferrugin (Blaud) ... ... gr. x.
P. capsici ... ... gr. ¼
Aloini et strychniæ et acidi arseinosi ... ...ãã gr. ⅓ dr.

I cannot speak too highly of this latter pill as a hæmatinic, which I find of great service in anæmia in dogs.

The patient has made an uninterrupted recovery, and although he to-day walks peculiarly by elevating the paws too much, there is only left a small exostosis on the parietal bone to prove where the bullet penetrated.

Miscellaneous.

"SWEET LAVENDER."

A PERFORMANCE of the above drama, by Arthur W. Pinero, was given at the Town Hall, Maidenhead, on May 7 and 8, with a matinée on May 8, in aid of the Victoria Veterinary Benevolent Fund for the assistance of necessitous widows and orphans of members of the Royal College of Veterinary Surgeons.

The *dramatis personæ* were: Mr. Geoffrey Wedderburn (of Wedderburn, Green and Hoskett, Bankers, Barnchester), Lucian Oldershaw; Clement Hale (his adopted son, studying for the Bar), Percy J. Simpson; Dr. Delaney (a fashionable Physician), Sidney F. Isaac; Dick Phenyl (a Barrister), Sydney R. Thompson; Horace Bream (a young American), Scott Hill-Reid; Mr. Maw (a Solicitor), Harry J. Webb; Mr. Bulger (Hairdresser and Wigmaker), Philip D. Thompson; Mrs. Gilfillian (a Widow—Mr. Wedderburn's Sister), Bertha Heybourn; Minnie (her daughter), Winifred M. Hards; Ruth Rolt (Housekeeper and Laundress at 3, Brain Court, Temple), Essie Crowe; and Lavender (her daughter), Beatrice M. Budgen. The play was produced under the direction of Mr. Alfred Starling; Mr. Walter W. Mead acting as stage-manager.

The stewards, &c., were Messrs. J. P. Balson, J. Barley, G. H. A. Currier, S. Dobson, W. E. Henry, R. Hill, G. H. Hunter, E. Neve, H. Neve, T. Pettit, F. Rutty, C. M. Townsend; and programmes were disposed of by Mrs. Diddams, Miss de la Hay, Miss Pettit, Miss Pope, Miss Rance. The orchestra, which was under the direction of Mr. F. Willett, included the Misses Millar Inglis, Lewis, Martin, Daisy Skinner, Mabel Swallow, and Messrs. C. Armitage, W. F. Gibbons, N. Langston, A. Webb.

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—May I crave a small space in THE VETERINARY JOURNAL to express my grateful thanks to all those members of the profession who so kindly responded to my appeal on behalf of the Victoria Veterinary Benevolent Fund. I enclose a short balance sheet which shows a profit of £69 14s. 10d., but in order that the Secretary of the Fund shall not be bothered with odd amounts I have sent him a cheque for £70.

May I also thank you, sir, for your kindness in so freely

advertising "Sweet Lavender" without charge.—I am, sir, yours faithfully,

PERCY J. SIMPSON, F.R.C.V.S.

Maidenhead, May 13.

Receipts. By Donations		£24	12	0
Sale of tickets, "Sweet Lavender"...		74	14	6
Sale of programmes, chocolates, &c.		10	5	8
		109	12	2
Expenditure		39	17	4
Balance, being total profit		£69	14	10

Reviews.

Ophthalmology for Veterinarians. By Walter N. Sharp, M.D., Professor of Ophthalmology in the Indiana Veterinary College. 210 pages, illustrated. Cloth, 8s. 6d. net.

This work is concisely written, well printed, and liberally illustrated, and will enable the reader to classify any affections of the eye he is likely to encounter in veterinary practice. The chapters deal with the anatomy of the eye, the examination, various diseases, injuries, parasites, errors of refraction and therapeutics of eye treatment.

It is questionable whether animals undergo a number of the eye troubles prevalent in human beings. They do not strain the eyes unnaturally to such an extent, nor try to decipher small print in a faulty light, neither do they suffer from some hereditary and acquired diseases affecting mankind which indirectly play havoc with the eyes.

The pages dealing with diseases of the eyelids, conjunctiva, cornea, and injuries of the globe of the eye seem to us to be the most valuable in the volume.

Operation for cataract is seldom performed in animals and then only in the case of the dog, and the intricate surgical procedure involved is really work for a specialist. After-treatment, too, can only be carried out imperfectly.

We should like to have seen the condition known as eczema of the eyelids in the dog fully discussed and reliable treatment suggested. It is a pathological state occurring very frequently in every-day practice which often bothers the veterinarian. It is rather surprising that the uses of hydrogen peroxide in ophthalmic work, and especially in purulent conjunctivitis, appear to have been overlooked.

We think that cold compresses and cold irrigation of the orbital region after prolapse of the eye-ball are very valuable measures. We welcome the book as being very instructive and of much practical value, and it breaks into a literary field that has not yet received the required attention at the hands of veterinarians. G. M.

The Occurrence and Development of Cervical Ribs in Man and some of the Mammals that have abandoned Quadrupedal Progression. By Walter Stapley, M.D., D.V.Sc., M.R.C.V.S. Proceedings of the Royal Society of Victoria, vol. xxv (new series). Part 1.

Cervical ribs are of great interest to the anatomist and the morphologist. In recent years they have become attractive to the surgeon on account of the variation a well-developed cervical rib causes to the course of the subclavian artery. It also produces curious nerve changes in the distal parts of the upper limb.

The surgical aspects of the disturbances caused by a cervical rib are admirably discussed by Keen in a brochure published in the *American Journal of the Medical Sciences*, 1907. Stapley acknowledges his indebtedness to Keen's work, and discusses various opinions concerning the nature of those lateral elements of cervical vertebræ usually termed cervical ribs. The morphological significance of cervical ribs in mammals involves a consideration of the number of cervical vertebræ. Every student of mammalian anatomy learns with surprise the remarkable constancy with which the number remains almost uniformly seven, whether it be the long neck of a giraffe, or the short neck of a seal. The chief variations in the mammalian subkingdom are found among sloths. The two-toed sloth (Unau) possesses only six cervical vertebræ, but the three-toed sloth (Ai) has the exceptional number of nine. These variations are carefully discussed by Stapley, and he offers some instructive criticisms on the mode of enumerating cervical vertebræ deserving the attention of comparative anatomists. His work is also interesting because he endeavours to show that the additional cervical vertebræ of the three-toed sloth are due to atrophy of the first and second ribs; the atrophy he regards as a consequence of the peculiar manner in which this sloth hangs from the branch when browsing.

Stapley is not too familiar with morphology; the principles underlying the development and ossification of the vertebral column he gleans, like Keen, mainly from Bland-Sutton's description in Morris's "Anatomy." Although Stapley cannot make up his mind to regard cervical ribs either as anomalies or as vestiges, he agrees with the best authorities that atavistic parts do not belong to forms palæontologically or systematically far distant, and that the ancestry of such structures lies in forms closely allied. He endeavours to show that cervical ribs develop in the human subject because the lungs have migrated towards, and encroached upon, the neck. His critical analysis of the facts relating to cervical ribs and anomalies in the number of mammalian cervical vertebræ is of great interest, but we fail to find in it a convincing explanation of the fixed type manifested by the skeleton of the mammalian neck.

J. B. S.

Translations.

LAMINITIS AFTER TAKING *CARDAMINE PRATENSIS* (MEADOW BITTER CRESS, LADIES' SMOCK, CUCKOO FLOWER) IN GREEN FOOD.

By Chief Veterinary Surgeon PFEFFERCORN.

On July 19 twenty-six remounts were taken ill at Schleinitz with symptoms of laminitis. The fore limbs were stretched apart whilst the hind limbs were advanced under the body. The gait was cramped, the steps short and quick, weight was not borne on the toes, but on the heels. In a few specially severe cases the horses were quite unable to move. Local examination showed increased warmth, great pain on tapping the hoof and on pressure with the pincers. Pulsation of the digital arteries was very strong. General state of health more or less disturbed, whilst in slight cases neither fever nor any great loss of appetite occurred, yet in severe cases there was moderate fever, loss of appetite, and constipation. On account of the number of horses affected suspicion at once pointed to the food. Closer examination showed that cuckoo flower was present in the fodder, and this, as is known, causes the above-mentioned symptoms.

Cardamine pratensis is a cruciferal which is only toxic when in full bloom and fed green; in its dry state in hay no illness has yet been noticed to arise. Through the sweating process, which is accompanied by fermentation from the respective bacteria and kept up by them, water is lost, and in favourable conditions a chemical change takes place which renders the toxic material harmless. It is believed that the nature of the soil on which the plant grows exercises an influence on the formation and amount of the poisonous matter. But not only the soil, but also the manuring and watering, must decide the formation of the toxic material.

The susceptibility for the poison seems to be rather similar in all cases, and is not influenced by breed, age, or sex.

On the method of action in producing illness one is not yet informed. It is most probable that the injurious material is a pure chemical poison.

The plant in question occurs in the fodder grown in newly-cultivated meadows. From the pasture concerned at Schleinitz a cart load of grass in a half dry state, together with vetches, was fed. For four days this was supplied without any subsequent effect on the remounts. It is assumed that the poisonous plant, which in its half dry state was scarcely recognizable in the food, was present, and incorporated in large quantities in the fodder on the day in question.

Treatment was immediate and energetic—bleeding, subcutaneous injections of arecolin, arecolin-eserine, diet, and placing animals in clay—and followed by recovery in all cases.

The course of the malady was varied. In most of the horses the symptoms disappeared from the fourth to the fifth day; in

others it remained a week and longer, even up to two weeks; laboured and sensitive movement and lack of appetite remained.

On the ground of these observations it is recommended only to feed fodder from meadows in which ladies' smock grows in quantity in its dry state, and not to give it green.—*Zeitschrift für Veterinärkunde.*

A GOOD FEEDING FOR MILCH COWS.

By M. J. DUPONT.

For twelve years we have had the supervision of a dairy farm in the suburbs of Paris. The following rations have furnished us with the best results:—

Ration for twenty cows at two meals.

Bran	100 kilos.	=	200 lb.
Cut forage (lucerne, sainfoin, clover)	50 ,,	=	110 ,,
Rye meal } Maize meal }	40 ,,	=	88 ,,
Common salt	1 ,,	=	2½ ,,
Rick food (good meadow hay for preference)	100 ,,	=	220 ,,

This ration produces a good supply of milk on condition that the rye and maize meal are scalded. To do this *water at the boil* is poured on the meal in the proportion of three parts of boiling water to one part of meal. A bucketful of meal absorbs about three bucketfuls of boiling water.

Two persons make the mixture; one pours in the water and the other mixes the meal so that there are no lumps in it, the whole operation being done rapidly.

The mixture made, it is covered up to retain the heat, and is not used until three or four hours afterwards. The homogeneous paste thus obtained is intimately mixed with the bran, and afterwards the chopped forage is added and incorporated.

To this nutritive and healthy feed a good warm drink made with thirds or barley meal is added.

Beetroot feeding has never given us good results. The milk produced has been neither good nor abundant when these have been used. Carrots, on the contrary, may be recommended, without, however, giving in too large quantities at any time. Linseed cake gave excellent results when wishing to perfect fattening. Beetroot pulp (residue of sugar refining) and potato residues ought to be excluded from the feeding of the milch cow. The milk produced is mediocre in quality. The butter made from cream provided from cows fed on pulp leaves much to be desired. Its preservation is difficult. Pulp is largely used on farms in the large suburbs of Paris. Added to cut straw it forms the basis of the feed of milch cows in these quarters. The bad hygienic conditions of cow-houses and defective feeding contribute much to the multiplication of cases of tuberculosis which one meets with in Seine-et-Marne and in Seine-et-Oise, particularly in the Vexin.

At present the price of the typical ration which has always given good results is certainly rather high. Rye and maize are at a high figure. For some seven or eight years rye has sold at 11 to 14 francs a hundredweight; to-day it fetches 23 to 24 francs. Maize has increased less in price, but, nevertheless, the advance has been considerable. Rich foods have increased so much in price that town milk producers have been led to find less costly rations. The economy obtained has often been more apparent than real. Certain by-products considered economical have really been little so.

It is regrettable that dairy farmers who produce rich and wholesome milk have no means of selling it at a sufficiently remunerative price. The leaning towards the anonymous milk of large dairy companies hinders the country cowkeeper from competing with firms which are gradually monopolizing the Parisian and suburban supply.

If perfection does not exist with the cowkeeper, it is still less so in the country on farms which supply the collecting depôts. The noisy outcry concerning pasteurization, of which so much is made—very wrongfully—does not hinder milk produced in the country from frequently being tuberculous, rich in impurities, because the product of tuberculous animals improperly housed in cow-houses that escape all regulations and all inspection. Too often from the point of view of the public milk is good which is well presented. The sale of milk is, above all, a matter of advertisement. Every isolated producer who wishes to adopt a rational feeding for his herd, a hygienic but expensive one, renders himself liable to extinction in the absence of well-organized and subsidized advertisement.

In order to bring about a sale of good milk veritably worthy of the name, a model farm with vast meadows should be established not far from Paris, capable of delivering shortly after milking the milk of recognized healthy cows.—*L'Hygiène de la Viande et du Lait.*

ON THE TREATMENT OF HÆMOPHILIA.

By W. SCHILLING,

of Bayreuth.

In a five-year-old boy who had sustained a slight injury to the gums all the hereinafter named remedies were used to check hæmorrhage. Lack of success followed the use of teaspoonfuls of salt, of calcium chlorate, adrenalin tamponing, pressure means, injection of diphtheria serum and sterile 10 per cent. gelatine, application of penghawar yambi and cauterization. Finally, as an experiment, 200 grm. of blood from a healthy man, after defibrinization and dilution with 750 grm. of physiological salt solution, was intravenously incorporated. Schilling is convinced that by this method alone and the use of Röntgen rays (so that, as in leucæmia, the spleen and the bony tubes can be lit up) was death from hæmorrhage avoided.—*Berliner tierärzt. Woch.*

EXPERIENCES ON THE INFLUENCE OF THE POSITION OF THE BAROMETER IN THE OCCURRENCE OF COLIC.

By Staff Veterinary-Surgeon VOMBERG.

Among the causes of colic in horses chills and eating straw furnish the chief statistical material.

Chills may arise from standing for a long time after exercise or after the severe exertions of manœuvres. Very often chills are assumed to be the cause when horses standing near the stable door are attacked with colic, or when there is an air outlet at the foot of the stable wall directly behind the horse.

On the internal physiological reaction between the skin and intestinal nerves such external conditions must influence the intestinal activity to a high degree, whether through changing the quantity or quality of the digestive juices or the intensity of intestinal movements.

The eating of soiled straw litter cannot be accepted as a sole cause of disease, otherwise many more colic cases would arise. Other factors must be concerned in the illness: slight gastric catarrh, dampness of the straw, influences acting on the sympathetic nervous system. Doubtless weather conditions play a part: external temperature, movement of air, position of the barometer, and dampness of the air. A low fall of the barometer is generally accompanied by damp, rainy weather, which frequently has as a result the chilling of horses and colic. According to my last observations on the occurrence of colic the barometer stood at not more than 750 m.m., and chiefly at about 740 m.m. It may be taken for granted that there is a certain connection between cases of colic and barometric readings as Chief Veterinary Scholz indicated in the *Z. für V.* for 1898. Also in the communications of Dr. Behrens in *Monatshefte für praktische Tierheilkunde* the connection between the weather and colic is plainly proved.

The object of my observations was to clear up the question of the influence of the weather and position of the barometer on the occurrence of cases of colic.—*Zeitschrift für Veterinärkunde.*

SARCOPTES SCABIEI IN MEN AND ANIMALS.

By Dr. JOSEF VESELY.

Many cases of itch in man are characterized by the fact that even by microscopic examination of diseased parts the passages or burrows of the parasites cannot be found. But this does not happen in such cases in which, as well symptomatically as also microscopically, the mites are found on the surface of the skin. According to Saidac, 40 per cent. of all diseases here are due to scab mites. Such diseases are mostly localized on the skin of the head and face, which places are avoided by the true scab mite of man (*Sarcoptes scabiei*, var. *hominis*). In the greater number of these cases it was proved that the disease

was transmitted from affected domesticated animals, chiefly dogs and cats.

Vesely has proved by the microscopic examination of the epidermis of scabby dogs and cats that in many cases the mite seeks out the hair follicle. The parasite penetrates into this along the hair and forms narrow, perpendicular and straight passages, at the lower end of which the parasite, with the head directed downwards, may be found. The walls of this passage are formed partly by the horny epidermis layer and partly by dried exudate; the cavity is filled with the excrement and eggs of the parasite. From the analogy of the mode of life of the parasites in transmission on to the skin of men the author reasons out the prevalent symptom of the transmitted disease. The parasite when penetrating into the hair follicle seeks out those which are most developed, and these are those of the head and face. This explains, according to Vesely, the absence of mite burrows in man and at the same time the special localization. The precedent hitherto in the examination of the epidermis (according to Eichstedt-Hebra) does not exclude this possibility. Further, it is known that such transmitted scab is much easier curable; and this is quite evident, since in the perpendicular and straight passages of the hair follicles the parasite concerned is more accessible to medicaments than in the horizontal and winding passages of the epidermis. At the same time this mode of life of the mite corresponds to the external symptoms of the disease, for it causes an inflammation of the hair follicle and falling out of the hair.—*Oesterreichische Woch. für Tierheilkunde.*

Letters and Communications, &c.

Mr. Payne; Professor Liautard; Dr. A. Hughes; Mr. C. J. Dixson; Mr. W. M. Scott; Mr. G. Mayall; Capt. Deacon; Mr. A. E. Willett; Mr. T. B. Goodall; Mr. J. F. D. Tutt; Capt. Pallin; Mr. Mitter; Professor Sisson; Professor Craig; Dr. Burton Rogers; Professor Law; Mr. Bevan; Mr. Haskell.

Books and Periodicals, &c., Received.

The American Veterinary Review; Journal of the Royal Army Medical Corps; Recueil de Médecine Vétérinaire; L'Hygiène de la Viande et du Lait; Revue Générale de Médecine Vétérinaire; Der Tierarzt; Zeitschrift für Veterinärkunde; Berliner tierärztliche Wochenschrift; Osterreichische Wochenschrift für Tierheilkunde; La Clinica Veterinaria; Revista de Medicina Veterinaria; Board of Agriculture and Fisheries; Department of Agriculture and Technical Instruction for Ireland; Kennel Gazette; Agricultural Journals for the Union of South Africa and for Rhodesia; American Journal of Veterinary Medicine.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

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